VARIAN

vacuum technologies

UPGRADE PROGRAM

V70 Series Pumps
vs
V81T Series Pumps

Technical Memo

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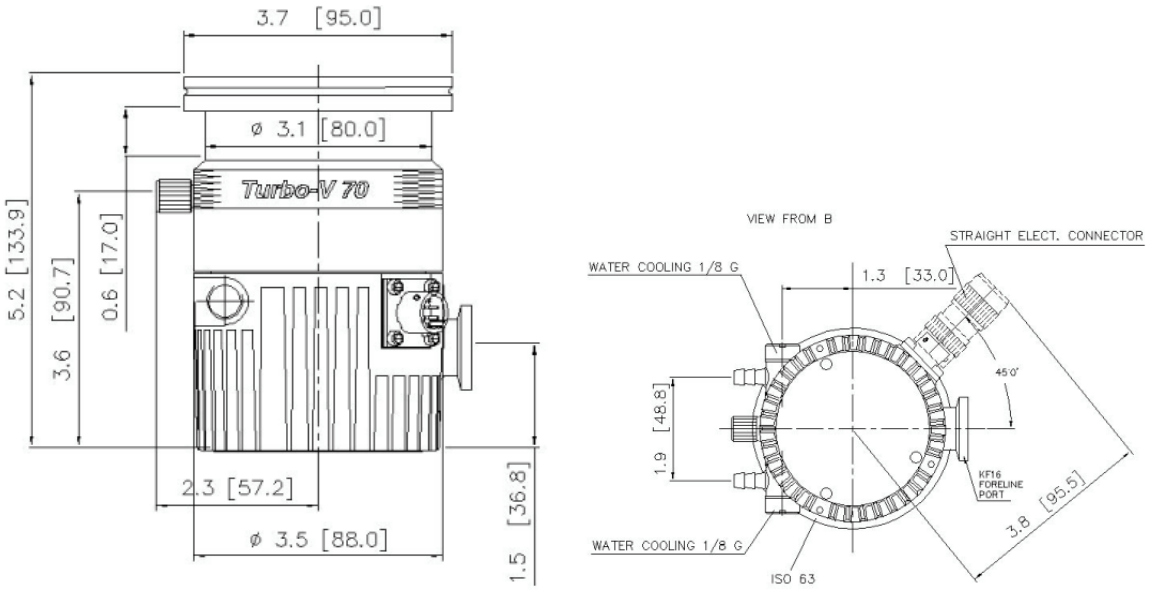
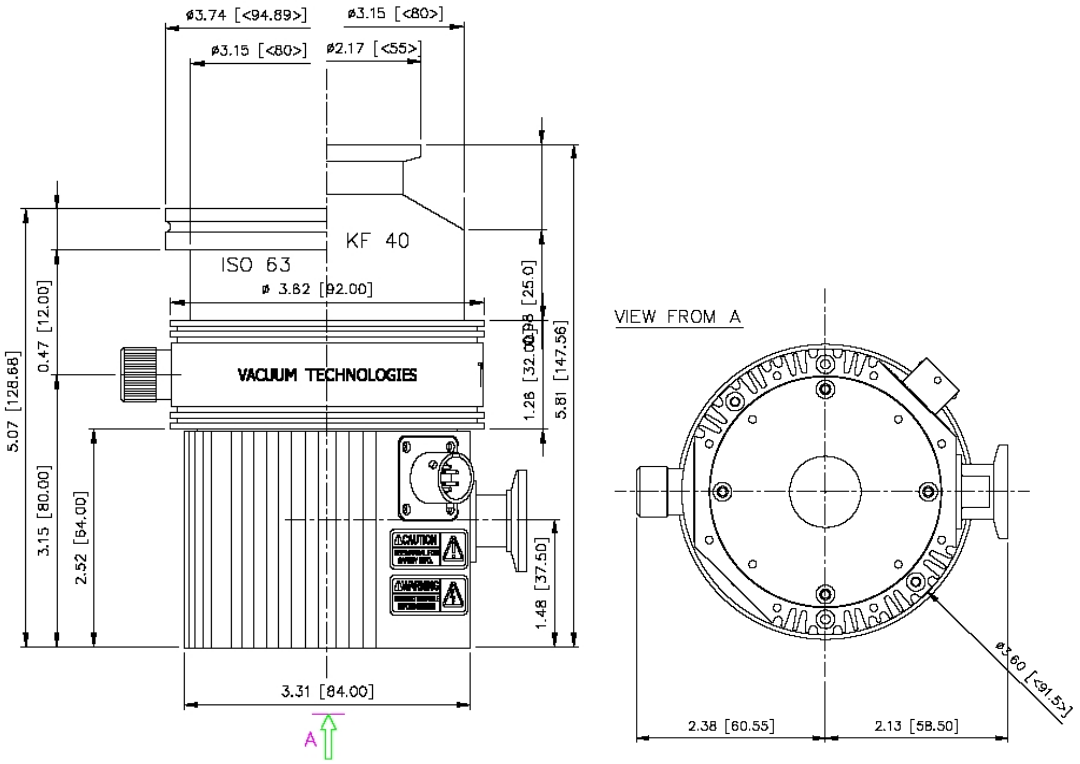
Outline Drawing ISO63

V70 ISO63 9699357



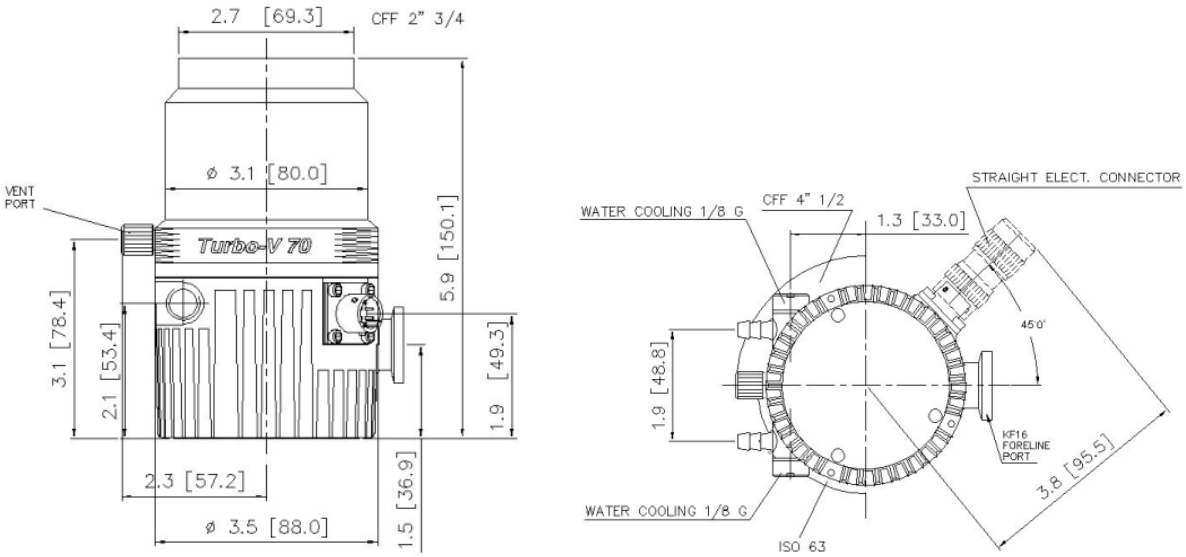
Replacement Suggested

V81-T ISO63 EX9698905



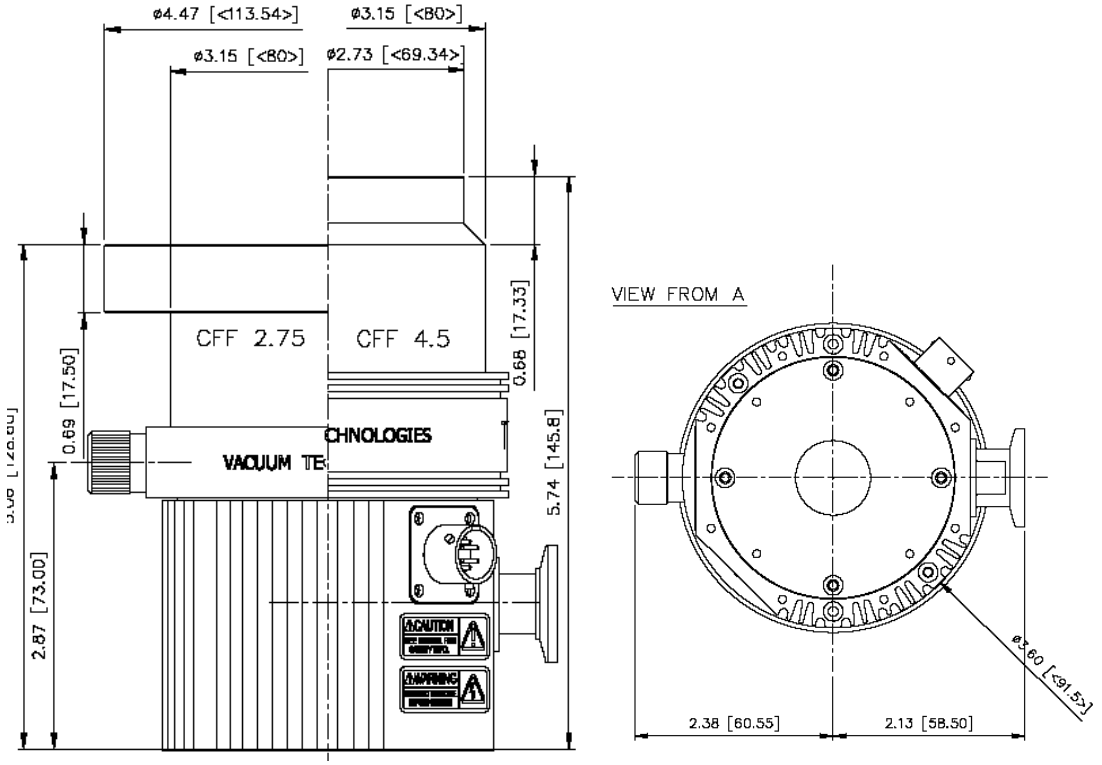
Outline Drawing CF2¾

V70 CFF 2-¾ 9699360



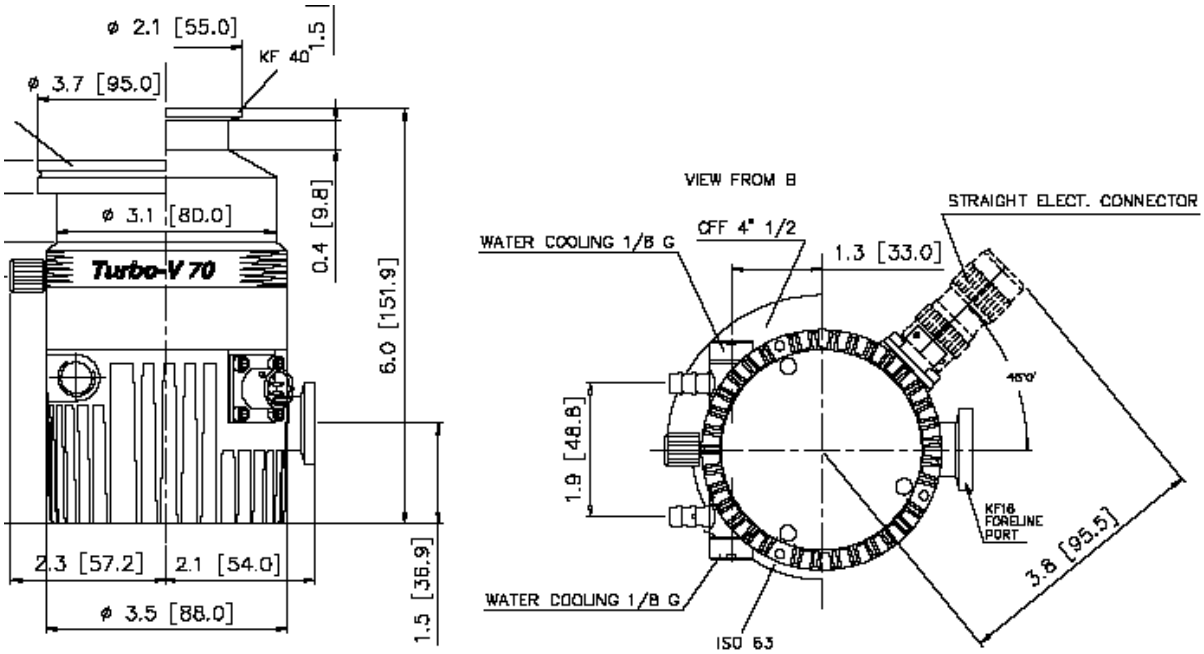
Replacement Suggested

V81-T CFF 2-¾ EX9698908



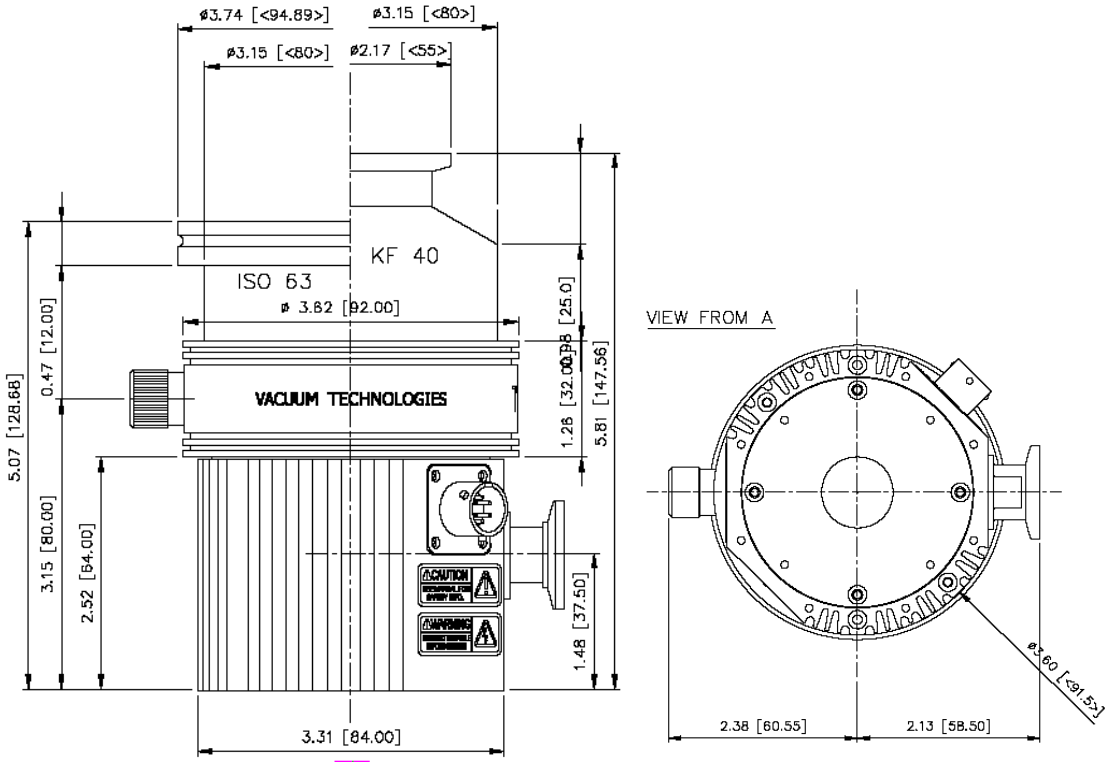
Outline Drawing KF40

V70 KF40 9699359



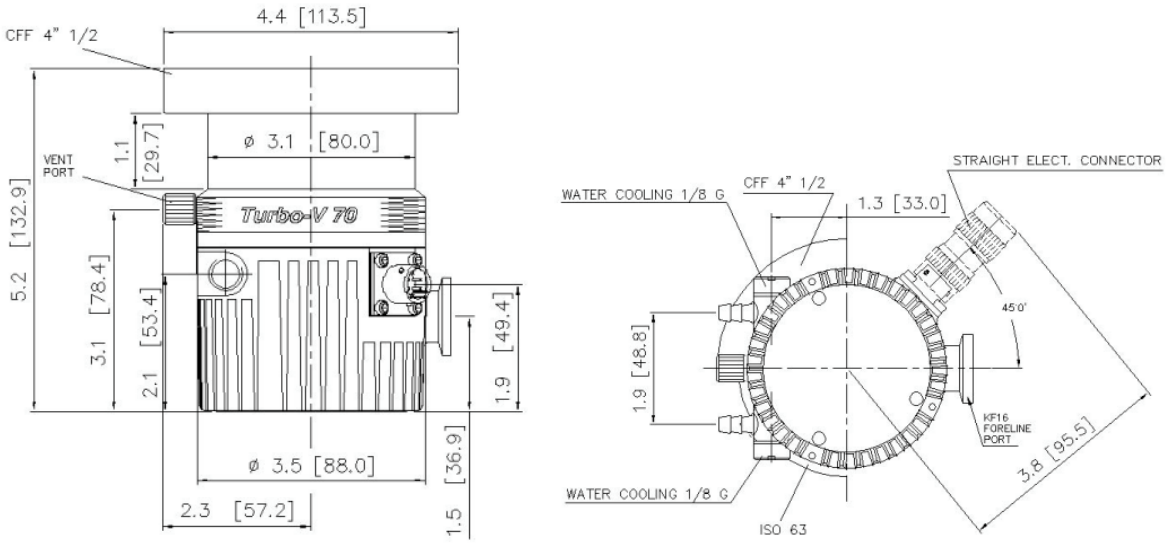
Replacement Suggested

V81-T KF40 EX9698906



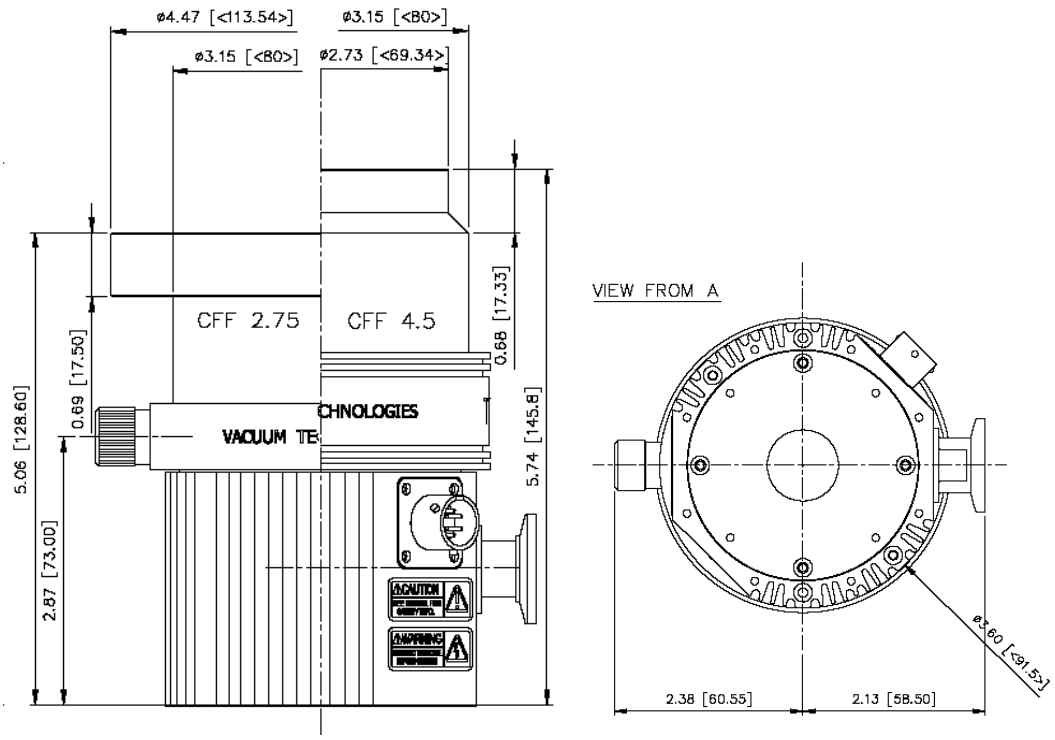
Outline Drawing CF 4-½

V70 CFF 4-½ 9699358



Replacement Suggested

V81-T CFF 4-½ EX9698907



Technical Tables

	V70 ISO63	V81-T ISO63
Total height	133.9	128.68
Vent port height from bottom	90.8	80.0
Foreline port height fm. bottom	39.9	37.5
Vent thread	M5	M8
Purge thread	Only S001 version	Only MSP* version
Water fitting thread	1/8 G	Plate with 1/8G
Inlet flange	ISO63	ISO63
Foreline Flange	KF16	KF16
Vent port position referring to Foreline Flange	180°	180°

* for pump with purge port, please contact Marketing for special quotation

	V70 CFF 2 ¾	V81-T CFF 2-¾
Total height	150.1	145.8
Vent port height from bottom	78.4	73.0
Foreline port height fm. bottom	39.9	37.5
Vent thread	M5	M8
Purge thread	Only S001 version	Only MSP* version
Water fitting thread	1/8 G	Plate with 1/8G

Inlet flange	CFF 2 ¾	CFF 2 ¾
Foreline Flange	KF16	KF16
Vent port position referring to Foreline Flange	180°	180°

* for pump with purge port, please contact Marketing for special quotation

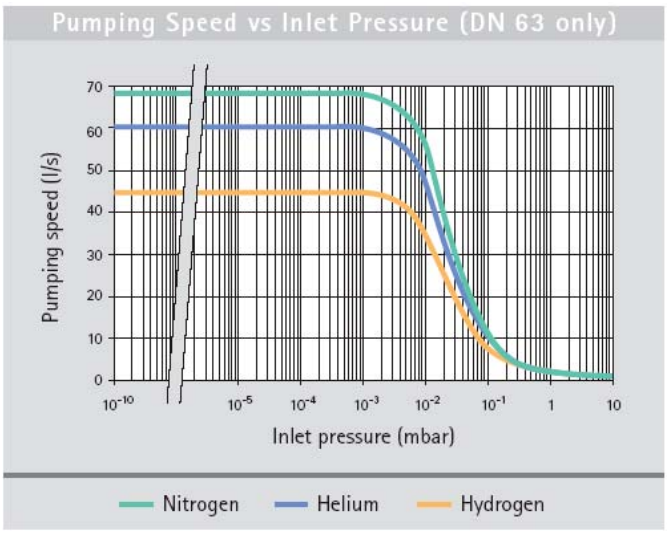
	V70 KF40	**V81-T KF40**
Total height	150.1	145.8
Vent port height from bottom	90.8	80.0
Foreline port height fm. bottom	39.9	37.5
Vent thread	M5	M8
Purge thread	Only S001 version	Only MSP* version
Water fitting thread	1/8 G	Plate with 1/8G
Inlet flange	KF 40	KF 40
Foreline Flange	KF16	KF16
Vent port position referring to Foreline Flange	180°	180°

* for pump with purge port, please contact Marketing for special quotation

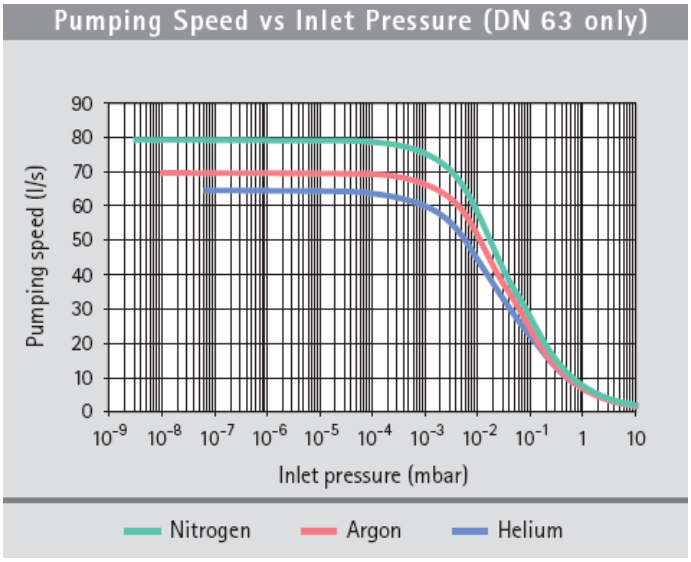
	V70 CFF 4½	**V81-T CFF 4½**
Total height	132.9	128.6
Vent port height from bottom	78.4	73.0
Foreline port height fm. bottom	39.9	37.5
Vent thread	M5	M8
Purge thread	Only S001 version	Only MSP* version
Water fitting thread	1/8 G	Plate with 1/8G
Inlet flange	CFF 4 ½	CFF 4 ½
Foreline Flange	KF16	KF16
Vent port position referring to Foreline Flange	180°	180°

* for pump with purge port, please contact Marketing for special quotation

Technical Specification:
Pumping Speed Curve:
V70 ISO63



V81 ISO63



Technical Specifications

	V70	V81
Connection nominal diameter Inlet Outlet	 ISO63 CFF4 ½ CFF 2 ¾ KF40 NW16KF	 ISO63 CFF4½ CFF 2 ¾ KF40 NW16KF
Pumping speed l/s N2 He H2	 68 60 45	 77 65 50
Compression ration for N2 He H2	 5x10e+7 4x10e+3 4x10e+2	 >7x10e+6 3x10e+3 3x10e+2
Max Forevacuum pressure mbar	10e-1 mbar range	0.2 mbar (N2)

Recommended baking pump Rotary Dry	 DS102 SH100	 DS102 SH110
Ultimate pressure mbar With rotary With dry	 1x10e-9 9x10e-9 (CFF)	 < 5x10e-10 <5x10e-9
Rotational speed	75000	80000
Run up time min.	< 60 sec	< 60 sec
Cooling	Air (optional water)	Air (optional water)
Coolant water	Flow: 10 l/h Temp: +10°C to 30°C Press: 2 - 4 bar	Flow: 10 l/h Temp: +15°C to 35°C Press: 2 - 4 bar
Power consumption W	150	100
Vibration level (displacement)	< 0.01 µm at inlet flange	< 0.01 µm at inlet flange
Noise level	< 45 dB (A) at 1 meter	< 45 dB (A) at 1 meter
Motor technology	Asynchronous	Asynchronous
input	54 Vac, three phase, 1250 Hz	76 Vac, three phase, 1350 Hz
Weight Kg	ISO 63 1.6 CFF 4 ½ 2.3.	ISO 63 1.8 CFF 4 ½ 2.6
Operating position	Any	Any

Technical Advantages

The Turbo-V 81-T pump has been designed in order to have the same performances of the present TV70 but in a smaller package. It has been designed according to the technical improvements of the drag pump having, as main target, a cost reduction; furthermore, the fins for air cooling have been optimized and the operating temperatures can be substantially lower, for optimized performances.

The most important advantage of the Upgrade is the possibility to replace the standard controller by the AG-Rack V81.

The Turbo-V 81-AG Rack Controller will be very innovative and with increased control and communication capabilities. The new rack controller is micro-processor-controlled, solid-state, frequency converter with self-diagnostic and self-protection features. The most important features are: front/remote/serial operation, 24Vdc pump fan cooling drive, vent valve drive (valve delay and opening time are adjustable), pump speed reading after stop command (allows monitoring of pump slow down time

after the stop command during the venting phase), regenerative braking (most effective pump deceleration without heat generation at the motor level), pressure reading through Varian EyeSys Mini-IMG Gauge, input voltage auto setting, remote I/O compatible with previous version, Navigator default serial compatible with the previous RS232 and RS485 version, Profibus interface (optional).

The controller is available in three models: base version, with RS232-485 option, with Profibus option.

The pump can also been operated by V70 series controllers. The rotational speed will be reduced and consequentially the performances (75 KRPM vs 80 KRPM); should a customer use the V70 Navigator controller attached to the bottom of the pump, a special plate is needed to enable the assembly.

Accessories:

1. air cooling kit: V81 series pumps work with natural or forced air (kit pn 9699290 with extension 9699940); V70 fan cannot be installed on V81-T pump. Should the customer keep his V70 controller, a connector-adapter is provided with the new fan kit

2. water cooling kit: the V81-T pump uses a brass plate to be installed on the pump bottom (9699823-9699824)

3. the vent valve to be used depends on the controller for the V81-T pump: should the customer keep his V70 rack controller, the vent valve has pn 9699843; should the customer use the V70 Navigator controller, the vent valve has pn 9699834; should the customer use the V81 AG controller, the vent valve has pn 9699844.

4. inlet screen has not changed (DN63 9699300 or KF40 9699309)

Controller Comparison V81 vs V70

The existing V70 series controllers are able to drive a V81-T pump; the rotational speed is limited to 75 KRPM instead of 80 KRPM and consequently the performances.

The V70 series controllers can be replaced by the V81 series controllers, that are available in following configurations:

1. V81AG Navigator on Board controller 120-220 V, pn 9698996
2. V81 ¼ AG-Rack controller, pn 9698988 (base), 96989889 (with RS232-485) and 9698990 (with Profibus), with input voltage from 100 V to 240 V

V81AG Navigator on board controller

The Turbo-V81-AG Navigator controller is a microprocessor based solid-state frequency converter with new- enhanced features allowing for further improved control and communication capabilities. The Navigator controller can be mounted on the bottom of our TV81-Navigator family of Turbo Molecular Pumps. In order to mount the controller a specific mounting kit is provided together with the controller unit. The units are fully controllable by a remote host computer via the serial connection by means of a Windows based dedicated software.

The main improvements and key differences respect to former TV70 Navigator controller (9698970 &9698971) are:

1) Output: Programmable Analog Signal 0-10Vdc Proportional to
or Frequency (existing)
or Power (existing)
or Temperature (new)
or pressure (new)

2) Output: Programmable set point (O.C.)
or Frequency (existing)
or Current (existing)
or Time (new)
or Pressure (new)

3) Able to read an External Gauge (**new Feature**)

To the new controllers an "EyeSys Mini-IMG" gauge can be connected by means of its extension cable. (See orderable parts table). The pressure can be read by serial line or by Remote I/O on Programmable analog Out, in this case the controller replicates the signal coming from the gauge.

4) Multilayer 4-Layer PCB design

In order to have major Immunity to EMI the new controller PCB has been designed with 4 Layers (former design had 2 layers). This is today's state of the Art electronics design.

5) Internal fan for 24Vdc version

In the new 24Vdc controller the improved design allows to work without internal FAN. This new solution eliminates potential vibration issues due to FAN.

6) Connectors

The new controller comes with shielded connectors only (DB15, DB9 & USB). This improvement respect to the former Molex type connectors has been introduced in order to reduce eventual Electro Magnetic Interference (EMI) issues.

7) Stop Speed Reading (**new feature**)

This is a new Feature available via RS232 connection. The benefits of this feature are:

Continued reading of pump speed after the STOP command.

Allows monitoring of pump slow down and specific shut down time.

V81 AG Rack controller

The Turbo-V 81-AG Rack Controller will be very innovative and with increased control and communication capabilities. The new rack controller is micro-processor-controlled, solid-state, frequency converter with self-diagnostic and self-protection features. The most important features are: front/remote/serial operation, 24Vdc pump fan cooling drive, vent valve drive (valve delay and opening time are adjustable), pump speed reading after stop command (allows monitoring of pump slow down time after the stop command during the venting phase), regenerative braking (most effective pump deceleration without heat generation at the motor level), pressure reading through Varian EyeSys Mini-IMG Gauge, input voltage auto setting, remote I/O compatible with previous version, Navigator default serial compatible with the previous RS232 and RS485 version, Profibus interface (optional). The controller is available in three models: base version, with RS232-485 option, with Profibus option.

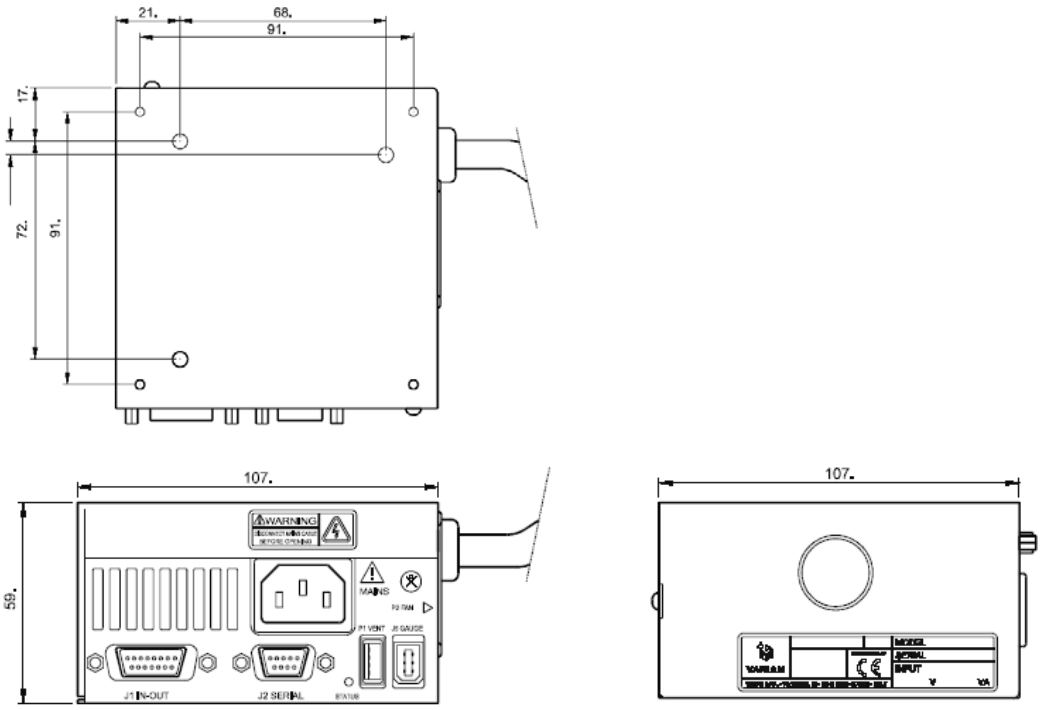
Advantages

The advantages are listed below:

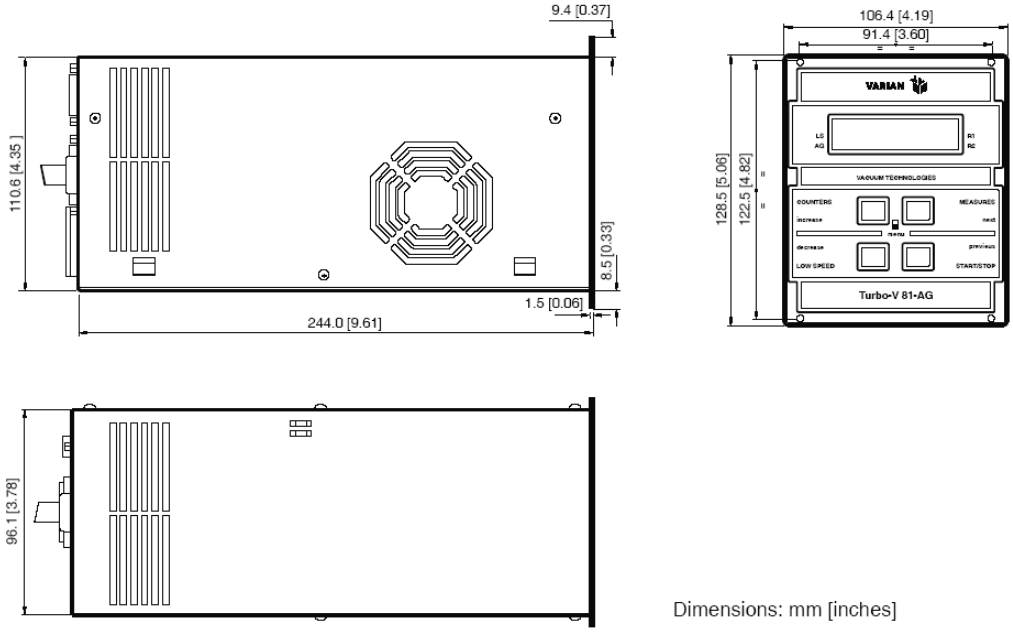
- valve delay and opening time are adjustable (it was fixed on V70 rack controller)
- pump speed reading after stop command (not available on V70 controller)
- regenerative braking (not available on V70 controller)
- pressure reading through Varian EyeSys Mini-IMG Gauge (not available on V70 controller)
- input voltage auto setting (manually selectable on V70 rack controllers)
- remote I/O compatible with previous version
- Profibus interface (optional)
- Navigator default serial compatible with the previous RS232 and RS485 version

Controller outline:

V81 Navigator on board:



V81 ¼ rack



Main cable is supplied; controller-to-pump cable is supplied.

Please refer to the Instruction Manual for further technical details (accessories connections, vent valve driving, RS232 protocol, Eyesy Mini IMG operation, etc).